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Original Article.

A CONSIDERATION OF THE ETIOLOGIC FACTORS IN MYOSITIS OSSIFICANS TRAUMATICA.

By Charles F. Painter, M.D., Boston.

To those whose practice calls for the treatment of fractures, the subject of this paper will bring to mind a certain number, probably not large as compared with the totals treated, of instances of this complication of that variety of trauma. The memories thus recalled will, furthermore, not be wholly pleasant ones, I surmise. It is not with fractures alone that this condition is associated, and, so far as my own personal experience is concerned, it has not been as a complication of fractures that my observations have been made. At most, the number of cases coming under my care have been few, and the only one that I shall cite in any detail is the most recent one.

A young man of 20 (W. L. M.),* a marine corps corporal, came to my notice on November 10, 1919, about seven weeks after he had received an injury to the left thigh while playing football. He was struck, when tackled, on the anterior surface of the left thigh. At the time, this injury was looked upon as a contusion, and was so treated in the Navy Yard Dispensary, with the result that after a few days he was returned to duty, which, however, he was not well able to perform because of pain and swelling about the thigh, and inability to flex the leg. He kept about at light duty, however, and on November 3, while going down a ladder, twisted his left knee violently. This resulted in an effusion in the joint, motion became more painful and more restricted and there was increase in surface temperature over the knee. At this time I saw him and put the leg in a cast, advising rest from duty. X-ray examination of the knee and lower thigh was negative on November 13, 1919. He was returned to the Barracks where the cast was removed at the end of two weeks, and the patient was recorded as well by the officer in charge.

On the 28th of November, 1919, the patient, a second time wrenched his left knee, bringing back the previous symptoms. At this time, he was admitted to the Orthopedic Service at the Naval Hospital. Here he was kept in bed, and though the swelling of the anterior surface of the thigh, which had been marked and very hard, had subsided to some extent, the effusion in the knee-joint did not subside, and thinking that there might have been an hematoma in the knee as well as the one in the thigh, I aspirated

* I am indebted to the Medical Officers in charge of the U. S. Naval Hospital at Chelsea for the opportunity to study this case.

the joint but obtained only normal straw-colored synovial fluid. He was treated by baking and light massage in an endeavor to restore his knee motion. He became able to extend it normally, but flexion, though improving, did not come back to more than a 50 degree angle. An x-ray (Fig. 1) was taken at this time, February 13, 1920, showing a calcareous deposit just above the patella, and on February 27th, this was operated upon and a good sized mass of osteoid tissue was removed from within the substance of the quadriceps tendon just at its insertion into the patella. In fact, in disconnecting the mass from the tendon, the association with the patella was apparently a very intimate one.

He convalesced quickly from this and about a month later, it became evident that a mass of bone had formed in the mid-thigh within the substance of the quadriceps extensor muscle; there was a long splinter of bone lying close to the periosteum (Figs. II and III), paralleling the shaft of the femur perfectly.

On March 24, 1920, this was removed through a long incision. The piece which paralleled the femur seemed defintely connected with the shaft of the femur. Outside of this and connected with it, was a more irregularly shaped mass of bony tissue which, on histological examination, appeared as normal bone. He convalesced well, recovered his knee-joint motion to better than a right angle, and secured complete extension in about a month. X-rays taken at frequent intervals since, have shown no increase in the deposits left behind after removal of all that were recognizable, and he was surveyed out of the service July 26, 1920.

Report from him, through Red Cross agents, says that he has had some trouble with his leg since his discharge, but to what extent and of what nature, I am unable to state at present. The osseous changes in the muscle in this case did not develop so as to be evident in the x-ray for at least four months after the injury, for he was radiographed quite early to be sure there was no fracture. Another unusual feature of the case was the two separate foci of ossification with but one real trauma to account for it, unless it be granted that the wrench which he sustained to the knee subsequent to the football injury was responsible for the mass developing at the insertion of the quadriceps tendon into the patella. Coley cites one case almost precisely similar, which he states was very unusual in the literature at the time he wrote his paper in 1914.

In looking back upon this case, I am convinced that I should not have operated upon it when I did, though the immediate effect was very satisfactory, for he secured nearly normal motion at the knee within a very short time, and he was able to get back the use of his leg much earlier than he otherwise would have been able to have done. It was not possible to judge of the extent of the infiltration of the muscular tissue with the ossifying process, and some was left behind, which, it is probable, explains the report of further trouble which has been brought to me through the Red Cross.

The main interest in a study of this condition centers about the diagnosis of the disease and its method of origin. There have been a good many reviews of the literature of the subject, and among them are several papers that are of more than statistical interest, notably those of Coley, Binnie, Finney, Robert Jones and Morgan, and Morley in English; Lapointe and Cohier in French, and Strauss, Gruber, Kalk and Kreig in German; also as bearing upon the questions involved in etiology, the work of Macewen, J. S. Davis and Hunnicut, upon the experimental study of osteogenesis in the periosteum, are of much interest.

A considerable contribution will undoubtedly be made as a result of war experiences, for already a large number of cases are being reported

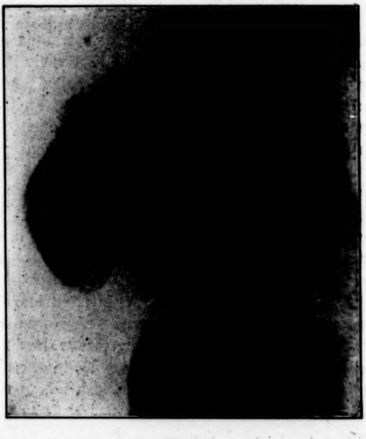

FIG. I.

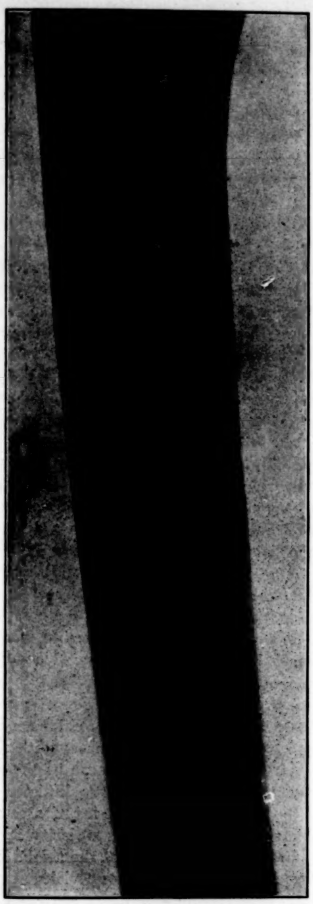

FIG. II.

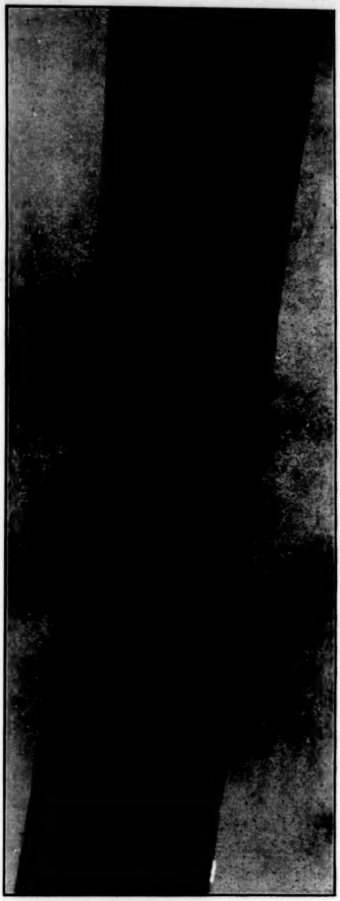

FIG. III.

of instances of this condition as a result of gun-shot injuries and other traumata incidental to military service. I am, of course, discussing only one variety of myositis, and that is the traumatic, commonly known as Myositis Ossificans, Traumatica, Circumscripta. There are two others, *viz.*, myositis ossificans progressiva and the localized form which occurs as a result of oft repeated, slight, traumatic irritations to some particular region, *e.g.*, the inner side of the thighs in jockeys, where the lesion is known as "Rider's" or "Exercise" bones. Sir Robert Jones, with the collaboration of Dr. Morgan, a radiographer of Liverpool, had collected, in 1912, a series of more than 250 reported cases which, with his own, brought into the literature at that time, 339 cases. Of these, 169 were sufficiently well recorded to make the case reports valuable for statistical purposes. The vast majority occurred in early to middle adult life.

From the 15th to 20th year, there were 15 cases.

From the 20th to 23rd year, there were 76 cases.
From the 24th to 30th year, there were 14 cases.
From the 30th to 40th year, there were 25 cases.

The youngest was five years, and the oldest was 65. There were only 13 females in the whole 339. Any muscle may be affected, but the three most common were, the brachialis anticus, the quadriceps extensor, the abductor longus, and the biceps of the upper arm, in this order. The cases were studied with reference to the length of time taken in the formation of the osseous tissue, and gave the following facts:

Less than one month	30 cases
From 1 to 2 months	40 cases
From 2 to 3 months	17 cases
From 4 to 6 months	10 cases
Several months	5 cases
Several years	8 cases

These authors incline to the belief that myositic deposits of this character may be caused in more than one way. They give it as their opinion, however, that the majority of these are produced by osteogenesis of avulsed periosteum, which when it has escaped into the muscles enveloping the bone from which the periosteum has been torn off, continues to grow. True bone is produced in this manner, bone which cannot be distinguished from callus. They quote, only to discount, the theory of Grawitz and Solmon, who, having found increase in local temperature, pain, tenderness, and swelling on clinical examination, and upon histological study cloudiness of muscle first, with, later on, degenerative changes in the muscle fibres and small round celled infiltration of the parenchyma, are disposed to regard the process as inflammatory. No other modern observers entertain this view.

Binnie uses a case of this condition occurring in the brachialis anticus muscle, and a review of the literature as the text for a discussion of the theories of causation of the disease as they were regarded in 1903. The two theories by which the lesions were explained at that time were (1) the organization of blood clot with ossification of the organized clot taking place as a final stage, and (2) the transplantation of a periosteal flap. The latter is the one which seemed to Binney to best fit in with the clinical facts. The blow acting as an exciting cause, is inflicted when the muscle is taut and the fibers which are inserted into the periosteum avulse some of this membrane which then becomes drawn up into the midst of the muscle through the contraction of the detached fibers, where its osteogenetic powers cause the formation of new bone. He cites the experimental work of Berthier, who made this observation upon rabbits. He cut off some muscle fibers together with the periosteum into which they were inserted and by electrical stimulation of the muscle made these fibers, with connected periosteum, draw up into the substance of the muscle bundle where small nodules of bone developed from these periosteal fragments. He discusses, only to discard, the theory of Cohnheim as applied to tumors, *viz.*, that there are wandering embryonal cells which under the stimulus of trauma might be made to proliferate, thus causing the muscle bundle in which the cells were present to ossify. This was an old hypothesis regarding the origin of tumors and has long since been discarded. He rather favors Ziegler's assumption of a definite diathesis which is another way of expressing the belief that all bone, cartilage or connective tissue cells embedded in a stroma are morphologically equivalent, one readily replacing the other under varying conditions. In proof of this, he cites numerous cases of metaplasia in tissue where there could be no possibility of osteogenetic cells wandering in or being carried in, *e.g.*, in the scars of abdominal wounds, etc., etc.

Finney reports six of his own cases and reviews the literature up to 1909. His chief contribution to the discussion was a suggestion that many of the injuries which serve as the starting point for these lesions are inflicted tangentially by kicks or football injuries received in scrimmage, and that a vast majority of them are inflicted upon the front of the thigh. When the muscle is taut and sustains a violent trauma from the side, the muscle fibers contributed to the muscle bundle from along the area of origin of the muscle, would be easily torn oway from their insertion into the periosteum and would many times carry fragments of periosteum along with them. He comments upon the rarity of this lesion in fractures or crushing injuries of the thighs or arms. He cites Nichols and Richardson as authority for the statement that myositis was a not infrequent complication of the "poop," which is of such common occurrence in the experience of football trainers.

His belief is that myositic ossifications are the result of periosteal transplants. For the most part, the French and German observers take this ground also. Finney cites Altier, Bernier and Sutton as maintaining this view. Virchow had, many years ago, called attention to the possibility of osseous growths being produced in this manner, remotely from the point of attachment of the periosteal flap. The only other theory that he considers, is the metaplasic. To maintain this theory, one must be prepared to prove an interstitial inflammation, and he cites instances of the formation of bone in the walls of abscess cavities, about foreign bodies long in the tissue, atheroma of arteries and infected abdominal scars or the villi of old toxic inflammations of joints.

When discussing the diagnosis of the condition, he states that a careful clinical examination, supplemented by x-ray, should enable the diagnosis to be made accurately in a majority of cases. Three of the instances he reports were referred with the diagnosis of sarcoma, from which, apparently, there is the greatest difficulty in differentiation. The common conditions from which one must make a diagnosis are: contusions, hematoma, myositis, periostitis, osteomyelitis, exostosis, syphilis, gout and sarcoma. He warns against too early operation because of the tendency to recurrence and because there is likelihood of spontaneous shrinkage and degeneration.

Coley's paper on this subject in the *Annals of Surgery* (Vol. 57, 1913), is of greatest interest because of this discussion of the differentiation from sarcoma in the bone. The chief points made by both Coley and Finney along this line are that sarcomata are much more likely to be at or near the epiphysis, whereas myositis ossificans is far more likely to be in the middle of the shaft or at least away from the epiphysis. Sarcomata are rarely as uniformly hard on palpation; there will be some areas that are soft and more yielding to pressure. The tumor mass of a sarcoma increases steadily in size, but that of myositis ossificans tends to lessen after the period of growth, which is a matter of two or three months, as a rule.

In the x-ray study of these conditions, periosteal sarcoma is less clearly defined and there are frequent indentations of the tumor mass on the side toward the bone from which it is derived, whereas in myositis ossificans there is a clearly marked line of separation between the tumor formation and the shaft of the bone. The rest of the paper is given over to a consideration of other reported cases and the theories of causation. One of Coley's reported cases subsequently came to amputation and death from sarcoma in the original myositic mass with metastases in other parts of the body. In this case, the original x-rays were not at all suggestive of anything but sarcoma and it was only the pathological reports from portions of the growth removed for diagnostic purposes that could lead anyone to make a diagnosis of myositis ossificans. Morley states that this case of Coley's is the only recorded instance of a neoplasmic transformation in a myositic condition. It is probably because of this experience that Coley advocated in that paper exploratory operation in cases where doubt exists between these two conditions, and this in the face of the fact that exploration of malignancy in bone is more than likely to flare the process up into great activity.

Morley, writing in the *British Medical Journal,* for 1913, states that "myositis ossificans is due to a migration of osteoblasts into adjacent contused muscle and blood clot, after destruction of the periosteum and loss of its function as a limiting membrane to the growth of bone. It is essentially the same process as callus formation." He conducted a series of experiments upon animals, as a result of which he drew the above conclusions. It is a little difficult to understand wherein his theory disproves, or at least is any improvement upon, that of the periosteal transplant. It certainly would be difficult to separate osteoblasts from periosteum for experimetanl purposes, and it is hardly to be thought that under the conditions surrounding an accidental trauma it would be any easier. His suggestion in treatment, which would be a natural corollary to his theory regarding the "limiting" character of the periosteum, does not appear to have furnished as encouraging support to his major premise as he would have liked, for he rather guardedly intimates that when he has repaired the defect in periosteal scars by a fascial transplant over the area of denuded periosteum, he has had less tendency to recurrence of ossifying myositis. Such experience as I have had in bone surgery would lead me to question the ability of any man to find the denuded spot on the femur, as for example, at an operation for the removal of a mass of osteoid tissue, at a time that one would be likely to attempt to remove such a mass.

If these types are circumscribed and traumatic ossifying myositis are not different from those occurring around joints where fractures or dislocations have occurred, it is difficult for me to explain satisfactorily all traumatic myositis ossificans on this theory of Morley's. There must certainly be periosteal rupture and probable avulsion of strips of this membrane with attached osteoblasts in many fractures where no myositic manifestations occur. Hence, emphasizing the "limiting" character of the periosteum as a means of preventing the escape of osteoblasts into the surrounding tissues does not seem to be a sufficient argument to put all of the other theories of causation of this condition out of the running. Neither does the subsidiary argument lend very much aid to the contention, *viz.*, that crushing of muscle about the seat of periosteal avulsion contributes to this escape of osteoblasts, whereas in the absence of muscle crushing the intact muscle takes the place of the avulsed periosteum and prevents osteoblastic leakage. Such an argument has the merit of putting the burden of proof on the objectors to it, but it is hard to believe that there would be many instances where a trauma could be inflicted so severely as to rub the periosteum off a portion of the femur of an athletic young adult and not, at the same time, "muss up," more or less, the overlying musculature. If this seems reasonable, it would appear that there ought to be more myositis ossificans traumatica than there is, in view of the numbers of probable instances of such a combination of circumstances.

In a second article in the *British Journal of Surgery* (Vol. VII, pp. 178-182), Morley reports three cases of gun shot injury to bone. The wounds in bone were inflicted tangentially, grooves being cut in the bones, permitting (according to his theory, carried a little further in order to meet the new conditions) the escape of osteoblasts from the Haversian canals into the adjacent muscle, where they set up a typical deposit of new bone of the ossifying myositic type. He also cites a number of similar cases of Rocher, from *La Presse Médicale*, No. 59, 1916, December 14.

Sir A. P. Gould also drew the fire of Morley when he read a paper, published in the *British Medical Journal* for January, 1914, advocating the radium treatment of bone sarcoma. Among the cases reported were three or four which, from the history, were certainly more suggestive of myositis than of sarcoma, and one case of which he gave a full history, with x-rays both before and after treatment, which was beyond a doubt a true case of myositis ossificans. In the discussion which follows in subsequent issues of the *Journal*, Morley's contention was completely established by pathological investigation. The interest of this bit of the literature on the subject lies, of course, in the fact that distinguished clinicians may make the mistake of confusing such conditions. Such an error is more unfortunate in its possible consequence when the natural cause of the condition itself, as it progressed toward recovery, was ascribed to the use of radium.

This tendency toward shrinkage of the myositic masses when left to themselves, thereby showing their resemblance to ordinary exuberant callus after fractures, is well illustrated in the x-rays which Stone published in the *Archives for Radiology and Electrotherapy*, January, 1918, pp. 255. He presents a typical case of traumatic myositis ossificans with x-ray observations from the twenty-first day after injury to nine months after. These show a gradual and continuous increase in the density of the bony mass and its ultimate attachment to the shaft of the femur at a point where there probably had been a periosteal flap torn off.

Orr, writing in the *Missouri Medical Journal* for February, 1919, (p. 44, Vol. XVI), reports three cases of each of the three classes of myositis to which reference has been made in this paper, and favors the theory of Macewen that the periosteum is a limiting membrane and, when ruptured, permits osteoblasts to escape. He discusses in order all the theories which have been put forward as an explanation of myositic ossification. There is the theory that the lesion is (1) a true tumor formation; (2) the haemic theory; (3) the aberrant sesamoid theory; (4) the embryonal cell theory; (5) the theory of detached periosteum, which he reports because he thinks the periosteum is not possessed of osteogenetic power, and finally, (6) the theory of metaplasia of intra-muscular connective tissue. All of these he discards as unproven.

Gruber reports a case in the *Münch. Med. Woch.*, for 1915 (Vol. 62, 398-400), and he discusses the possible factors in causation. He seems to incline to the metaplasic idea and cites a number of instances where bone was formed in the connective tissue of the kidney, ovary, liver, bladder and elsewhere. "If there, why not in muscle?"

Krieg's case in the *Med. Klin.*, Berl., 1916 (xii, 535), is that of a gun shot wound in the buttock with an osseous deposit along the linea-aspera. There seemed to be no particular contribution to our knowledge of the subject contained in this report.

Lapointe's article in the *Rev. de Chir.*, Paris, 1912 (*Vol.* 46, 657-686), is a long but well presented discussion of the subject. It does not lend itself well to brief abstract. He shows the similarity in pathological appearances of the free and the continuous myositic deposits and argues that they must be formed in the same manner, *viz.*, through periosteal proliferation.

Ryan, in the *Ill. Med. Jour.* for 1913 (Vol. 23, 71) gives an interesting account of the earlier observations upon this subject, as does also Fay in a good article in *Surg., Gyn. and Obstet.*, 1914, (Vol. xix, 174-190). Fay points out that descriptions were given of osseous masses in bone by Copping in 1740, and by Freke in 1741. After these writers, similar observations were made by Otto in 1916; Kulm in 1830; Miescher in 1835, Schuh in 1854; Bilbroth in 1855, and Rokitowsky in 1856. Fay's idea that there may be two processes simultaneously operative, both tending to bone formation originating in connective tissue is a suggestion that may smooth out some of the difficulties in attempting to account for these lesions on any one theory.

Ryan goes back some 40 years to Volkman's description of the osteomas originating from the periosteum. He first noted these at the bases of old ulcers. He thought that the periosteum was stimulated to proliferation by the irritation of the suppurative processes. Later he, together with Rouset and Tillmans of Cologne, described bone tumors occurring in muscle.

Schultz, a German army surgeon, collected 295 cases occurring in military service in the decade preceding 1907. Werner reports 101 cases treated at the Munich clinics. Ryan outlines the theory of myositic inflammation as advocated by Busse and Blicker and the osteoma theory of Mays, Kimmel, Puitre, Welpenich, Munro, Pincus, Bartch, Cahier, and others. These ideas he regards as lacking proof for their substantiation. Nicoladoni thought that a neuro-trophic influence might account for the lesions. Tillman's idea was that there must be a liberation of synovial fluid which comes in contact with the muscle before the myositic deposits can be formed. There is no evidence to bear this out.

Virchow adhered to the idea that there was a peculiar diathesis which must be behind it all. He called it "Diathesis ossificans sive ossea." He felt that these deposits were on the border line between a tumor and inflammation, the result of muscle degeneration. Ryan concluded that all these ideas must be abandoned in the light of present day knowledge of the formation of bone from periosteal and connective tissue sources.

Bodier (*Bull. Med. de l'Algerin*, 1913, xxiv, 373) reports a case of myostoma after a serum infection. There was no trauma, other than that of the injection, but an extensive intermuscular haematoma.

The work of Davis and Hunnicut, published from the Hunterian Laboratory in the Department of Surgery of Johns Hopkins Hospital, appearing in the *Johns Hopkins Bulletin* for March, 1915, is of much interest at this point in the discussion. They undertook to check up Macewen's findings and corroborate or disprove his idea that the periosteum was only a limiting membrane and had no osteogenetic properties. Some observers and experimenters had agreed and some had not. Their conclusions are, so far as they bear on the question at issue here, *first*, that periosteal transplants, in the majority of cases, do not produce bone, even when osteoblasts are adherent; *second*, pedunculated periosteal flaps produce no bone when swung around and free, except for the pedicle connecting them with the bone; *third*, free periosteal flaps and pedunculated flaps with bone shavings attached, produce bone in every instance; from this they feel justified in making the inference that in the few cases where bone formation did occur with free periosteal flap, in their experimental work, that it was due to the accidental and unintentional inclusion of a bone chip or shaving.

This brings us to a point where we ask ourselves if we can honestly say that the evidence in hand is sufficient to prove the case for any one of the theories advanced as causative in the production of traumatic myositis ossificans. So long as there is a progressive type of the disease occurring in the young and extending through practically all the striated muscles of the body; and so long as these muscles seem to have a tendency to revert to an osseous condition by a retrograde metaplasic reaction, whether it be inflammatory or simply katabolic, there is some ground for feeling that in the isolated cases where single traumata seemingly act to incite an ossification in muscle, these may be individuals, who, having escaped the progressive form of the disease, still have just enough of a tendency toward that type of katabolic transformation to react to the stimulus of a violent trauma. That there is an intermediary class of persons who have never had the progressive type and who, through suffering, as all of us may, from traumata of equal severity to those causing a traumatic myositic development in many individuals, have also escaped from any of these lesions, but who, under slight, oft repeated traumata, have developed transformations in tendon sheaths and the fascial attachments of certain muscles, *e.g.*, the tendo Achilles and the adductor longus, this fact, I say, is again suggestive that in all three classes it may be a matter of a diathesis or dyscrasia, in varying degree, that underlies them all. In one, no trauma is required to set into operation the retrograde metamorphosis; in another, it needs to be slight but oft repeated, and in the third, the trauma must amount to violence. There may be no very sound logic to this view, but certainly the theories of periosteal transplantation or osteoplastic migration are not sufficient to explain all the cases. If this diathetic theory will not cover all, then we must have two classes, in one of which there is one etiology and another in the other. This does not seem reasonable when the objective evidences of the condition are all so closely allied.

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COMPLICATIONS FOLLOWING CHOLECYSTECTOMY.[*]

By Irving J. Walker, M.D., Boston.

Cholecystectomy is now quite generally considered to be the operation of choice in most cases of inflammation of the gall-bladder, with or without stones. This has become a more or less standardized operation for the above condition, because of the fact that recurrence of symptoms was only too common after cholecystostomy. That cholecystectomy is to be permanently accepted is now assured, when its results are compared with those of simple drainage of the gall-bladder. The latter, however, will always be used to a greater or less extent where removal of the gall-bladder is inadvisable. My own statistics, as well as those of others, indicate that the mortality in removal of the gall-bladder is certainly less than in drainage.

In analyzing 100 consecutive cases, I find that I removed the gall-bladder in 88 cases, with no deaths, and drained on 12 occasions, with two deaths. This series does not include cases where common duct stones were found. In checking up my reasons for drainage in the 12 cases, I find that on most of these occasions my judgment was probably correct. My reasons for cholecystostomy in these cases are briefly outlined below:

1. Acute cholecystitis and cholangitis with stones, complicated with lobar pneumonia. Patient was operated on under local anesthesia, and the gall-bladder drained. Patient died 24

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[*] This is a very small part of the literature of the traumatic type of myositis ossificans only, but it is the essential part, however, as revealed in the Index Medicus since and including 1914. The bulk of that not referred to here, either directly or by the authors consulted, consists of case reports and is, therefore, chiefly of statistical interest.

[*] Read at the meeting of the Dorchester Medical Society on April 20, 1921.

hours later. This was an almost hopeless case and probably would have succumbed to pneumonia had no operation been done.

2. Chronic cholecystitis and pancreatitis, associated with diabetes. This patient also was operated on under local anesthesia. I did not deem it wise to remove the gall-bladder, fearing that a prolonged operation under general anesthesia might aggravate the diabetic condition, and also because of the fact that pancreatitis was present.

3. Chronic cholecystitis with stones. This was a small, contracted gall-bladder in a very obese man. Possibly this gall-bladder could have been removed, but this was not done because of the apparent technical difficulty.

4. Chronic cholecystitis in a very obese woman, complicated by a poorly compensated heart. Gall-bladder was not removed because of the heart condition.

5. Acute cholecystitis and acute appendicitis, with abscess formation. Here the gall-bladder might have been removed had I attended to this part of the operation first. However, I chose to remove the appendix and drain the abscess through a right rectus incision. I then opened and drained the gall-bladder through a separate incision.

6. Acute cholecystitis and cholangitis. In this case the patient was very sick, and for that reason I merely drained the gall-bladder. There was some jaundice at the time of operation. Patient did not do well after drainage of the gall-bladder. The jaundice and temperature persisted, and two days later I did a secondary operation in which I opened the common duct, thinking of the possibility of there being stones there. None were found, however, and the duct simply drained. Patient died shortly after this second operation. Had I drained the common duct at the first operation, I feel that the patient would probably have lived.

7-12. These were cases of acute cholecystitis, with empyema or gangrene of the gall-bladder. Most of these were done early in the series, and because of the poor condition of the patient, or the technical difficulty, as well as pathological changes in the gall-bladder itself, I deemed drainage, rather than removal, advisable. I feel quite certain that I should now remove a large percentage of the gall-bladders in this group, possibly combining drainage of the common duct where any infection of the latter was found to exist. I have since heard from seven of these patients. One has died from influenza. Five say they are well, as far as symptoms referable to gall-bladder are concerned. One gives evidence of present trouble with the gall-bladder, the symptoms resembling those of cholecystitis without stones.

It has been said that cholecystectomy is equally as safe an operation as drainage of the gall-bladder. This can be so only in the hands of the experienced surgeons who have mastered the technique of each operation. It certainly seems more reasonable to expect that an occasional operator in gall-bladder surgery would be better prepared to simply open and drain a gall-bladder than to attempt its removal. Unquestionably, the technique of the latter is more difficult than that of drainage. This reason in itself should not be an excuse for these surgeons to continue to drain gall-bladders rather than remove them. It would be far better that they try either to perfect themselves in cholecystectomy and thus be prepared to carry out that operation when advisable, or cease to continue to do gall-bladder surgery, allowing such cases to be cared for by those better trained in the technique of removal of the gall-bladder.

Cholecystectomy is not without its unpleasant incidents at the time of operation and the occurrence of complications during convalescence. In these 88 cases where the gall-bladder has been removed, there have been comparatively few complications to worry the operator very much, but certainly some have been a trifle annoying. Below are cited some of the incidents which have occurred in this series, as well as some in the practice of my colleagues, and are mentioned as possibilities which may occur at any time in the operation for cholecystectomy. Roughly speaking, these unpleasant accidents and complications may be classed as occurring at the time of operation and later during the convalescence. Hemorrhage and injury to the common duct are the most common occurrences encountered at the time of operation.

Hemorrhage.

With this annoyance I have had a little difficulty at times. It was more evident in my early cases where I attempted to remove the gall-bladder from above downwards and perhaps was working through rather a small incision. In practically all cases, I now make the incision starting just below and to the right of the ensiform and continuing downward, ending about one inch to the right of the umbilicus. This, of course, varies with the position of the liver. By rotating the liver, where possible, an adequate exposure of the gall-bladder and its ducts is obtained, so that the cystic duct and artery can be ligated, the bleeding thus controlled, and the gall-bladder removed from below upwards. Wherever possible, it is best to ligate the duct and artery separately. However, this is not absolutely essential. On five occasions, while tying the cystic artery, the tie has slipped, or was pulled off. This was easily caught again and ligated is four of the cases. In the fifth, which was a very obese woman, after two unsuccessful attempts to tie the artery below the clamp, this procedure was abandoned and the clamp left in place with the handles projecting from the wound. Five days later, the clamp was loosened and removed, with no sign of bleeding. This technique is mentioned as a possible means of checking hemorrhage from the cystic artery when tying the same seems to be difficult or impossible.

In some cases, there has been considerable oozing from the raw surface of the liver after removal of the gall-bladder. Of late, this has been, to a measure, lessened where it was possible to enucleate the gall-bladder, leaving as much peritoneum as possible and, later, sewing together these edges, thus bringing pressure over the raw surface of the liver from which the gall-bladder has been removed. Pads soaked in hot salt solution or moistened in peroxide of hydrogen and held against the oozing surface are often sufficient to check this slight bleeding. Many times, if this bleeding is not great, a strip placed at the stump of the cystic duct and brought along the sulcus left by removal of the gall-bladder will stop oozing and serve as a drain. Where this passes through the abdominal wall, it is best to surround it by rubber tissue so that its removal may be less annoying to the patient. I am positive that I have been less annoyed by bleeding in those cases where I have removed the gall-bladder from below upwards.

I have never seen, but do know of one case where the portal vein was injured in cholecystectomy. It is needless to say that the outcome was fatal.

Injury to the Common Duct.

There does not seem to be any necessity for injuring the common duct in cholecystectomy, provided ample exposure is obtained by an incision sufficient in length so that the ducts may be readily palpated and observed. Observation is greatly facilitated by rotation of the liver and displacement of the stomach and duodenum toward the middle line. With the common duct thus stretched, the cystic duct should be identified at the point where it joins the hepatic duct to form the common duct. In most cases it is necessary to remove a thin layer of peritoneum and connective tissue covering the cystic duct before the latter is absolutely brought into view. When once this is done, the cystic duct can be easily clamped and ligated without encroaching upon the common duct. In none of my cases was there injury to the common duct. In several, however, the cystic duct found in close relation to the common duct might have been injured had the former not been carefully isolated before ligation.

There are several complications which may occur immediately after the operation or some weeks or months later. Some of these are trivial and, eventually, are easily remedied, but others may lead to more serious conditions, even requiring future operations to correct.

Vomiting.

Post-operative vomiting occurs, perhaps, more frequently after gall-bladder operations than other abdominal conditions. Where one is working in close proximity to the stomach this should be expected. There never need be great concern unless it is prolonged. It is better that the amount of fluid by mouth be restricted for eighteen hours after operation, then gradually started in small and increasing amounts. In the meantime, the body fluids may be maintained by giving glucose solution, tap water, or saline by rectum. One of the most common causes of persistent vomiting is acute dilatation of the stomach. Occasionally one sees vomiting which continues for a long period even after the usual corrective measures have been followed. The reason for this I do not know. I found in one such case that giving a considerable amount of intravenous saline did stop the vomiting after a while, when other means had failed. This was a case of common duct stone, where the latter had been removed together with the gall-bladder, the opening in the common duct closed and drainage instituted by passing a catheter through the cystic duct into the common duct, an operation described by Halsted,[1] and called cystico-choledochostomy.

Pulmonary Complications.

Pulmonary complications following surgery of the biliary tract are not uncommon, especially broncho-pneumonia, and, occasionally, the lobar type. This we may expect, since the individuals are usually obese persons who do not take an anesthetic well. Again in gall-bladder surgery, one is working in close proximity to the diaphragm which, because of irritation through manipulation of the adjacent organs, may have its normal function somewhat impaired during the operation and for some hours afterward. As a consequence, there would naturally be impaired respiratory action on the part of the lungs and congestion of the same with the possibility of the broncho or lobar pneumonia. As in all laparotomies, the usual care should be taken before and after operation to lessen the chances of such complications. In my opinion, after operations upon the gall-bladder or ducts, the patient should be placed on a head rest in a sitting position as soon as he comes from the operating table. Provision should be made to maintain him in this position, not allowing him to slump until lying flat on his back. Patient should be kept in this position day and night for at least five days. If pneumonia should develop, the necessary measures should at once be instituted to combat this. The patient should then be kept sitting up until temperature and pulse have returned to normal. In this series of cholecystectomies there were seven cases of broncho pneumonia and four cases of lobar pneumonia, all of which eventually recovered. Several more individuals had more or less severe bronchitis, but not such as to classify them as broncho pneumonia cases. All recovered.

Pulmonary embolism following cholecystectomy is not rare. It is a most serious complication and quite apt to be rapidly fatal. None occurred in this series, but I have observed two cases seen in the practice of other surgeons. In both instances this occurred following cholecystectomy for acute cholecystitis. The first occurred on the eleventh day, while the patient was still in bed, though rather active. The second occurred on the fourteenth day, the patient having been out of bed two days. Both were fatal in less than one hour.

Having in mind these cases, I have since made it a point not to allow patients operated on for acute cholecystitis to leave the bed before the sixteenth day. During the period from the ninth to the fourteenth day, I have insisted that they be kept absolutely flat, unless there is some indication to do otherwise. Furthermore, I feel that a thrombus usually shows some evidence of its existence in the way of temperature. Both of the cases mentioned above were running a temperature normal in the morning, but up to 99.5 or 100 in the afternoon, showing, in my opinion, that there was some evidence of infection. I have seen this in several of my own cases and judged this elevation of the temperature to be due to a thrombus in some of the vessels around the biliary tract. Therefore, I never allow a patient, after any gall-bladder operation, to be moved from bed when the temperature has gone above 99 at any time during the twenty-four hours. When once pulmonary embolism has occurred, little can be done. If the clot is large, the outcome is quite sure to be fatal; if small, there will be a rise in the pulse, temperature, and respiration, with severe pleuritic pain. A firm chest swathe with morphia enough to insure comfort, together with rest, is all one can do in the way of treatment. Usually the condition clears up in from two to five days, but occasionally a lung abscess may be the result.

Leakage of Bile.

This followed on eight occasions in this series of cholecystectomies. The time of leakage, as demonstrated by the appearance of bile on the dressings, occurred at intervals of from fourteen hours to five days after operation. This leakage, in most instances, took place where the gall-bladder had been removed from above downwards. This is a further argument for careful isolation and ligature of the cystic duct and removal of the gall-bladder from below. Where the appearance of bile was early, it was more profuse and lasted longer than where it appeared at a later date. In the former instances, it must have been due to a poorly placed or insecure ligature. The reason for the leak in the other case I cannot account for. In these late cases of leakage, there was only a slight discharge of bile, which generally ceased within forty-eight hours after removal of the drain. Where bile appeared after four days, it was the practice to remove the drain at once and substitute no other. The flow of bile then quickly diminished. It was deemed best not to remove the drain in the cases of early leakage, so that a definite sinus could be established and the area thus walled off from the general peritoneal cavity. It might be added that no harm resulted from leakage in any one case, except for skin irritation and some slight infection of the wounds.

This naturally brings up a question now under discussion, namely, that of the necessity of drainage after cholecystectomy. The chief argument for omitting drainage, I believe to be that of lessening the possibility of adhesions where drains have not been used. As yet, no large series of cases has been reported where this has been done, so that inference at this time is perhaps out of place. Dr. John T. Bottomley[2] has reported fifteen cases, with one death from general peritonitis. Willis[3] and Richter[4] have also written, advocating closure of the abdomen without drainage after cholecystectomy. It is quite certain that in the future, drainage will be used to a lesser extent. Drainage was used in all of the cases in this series.

Adhesions.

One instance of adhesions causing distressing symptoms after removal of the gall-bladder, occurred in this series. This case required two subsequent operations for recurrent jaundice before relief was permanent. A second case following cholecystectomy by another surgeon, was also operated on by me. In neither of these cases was there anything found or done at the primary operation for cholecystectomy which should account for the adhesions present when I operated for the relief of the latter. The convalescence in each case had been uneventful, without signs or symptoms of any infection. However, trauma or infection must have been the etiological factor. This again brings up the question discussed above as to the advisability of drainage after removal of the gall-bladder.

Infection.

No generalized infection of the peritoneal cavity occurred in these cases. Indeed, with drainage after cholecystectomy, this condition need hardly be considered, since one is working in a field where infection is well cared for because of the anatomical relationship of the organs, so that any infection which may arise is easily walled off to thus become a localized process. Where no drainage is used, general peritonitis is always a possibility. There were, however, several cases of greater or less extent of wound infection, none severe, and all occurring in the fatty layer of the abdomen, where infection is never well tolerated. This may have been due to one of three causes. (1) Faulty operative technique; (2) infection arising from the existing cholecystitis; (3) infection, the result of drainage. I am inclined to think that the latter may have been the cause of most of this trouble. It is a known fact that drainage in clean laparotomy cases is conducive to wound infection. Of late, in many cholecystectomies, I have closed the original incision and brought out the drain through a stab wound made at a suitable point. In doing this, there has been no infection of the original operative wound.

Jaundice.

Increasing jaundice usually means a stone in the common duct overlooked at the time of cholecystectomy. This is especially true if the jaundice be at first intermittent and associated with some pain and possibly chills and a temperature. Increasing jaundice would also naturally call one's attention to the possibility of a carcinoma encroaching upon the lumen of the duct. The probability, however, is that the offending factor is a stone. This complication requires a secondary operation with exploration of the ducts for its relief. If a stone is found, the trouble is easily remedied. If carcinoma is discovered, nothing is gained, and usually the case is found to be hopeless as far as its removal is concerned. The gall-bladder having been removed, no short circuiting of bile can be done, the result being a permanent biliary fistula. With the permission of Dr. Horace Binney, I am reporting below, a case from the records of the Boston City Hospital of recurring and finally persistent jaundice, resulting from obliteration of the common duct following cholecystectomy:

M. N., aged 44. P. H.—In 1917, he had the first attack of what was thought to be gallstones; in 1919, he had two similar attacks; in March, 1920, he had still another attack; he had never been jaundiced. In March, 1920, he was operated on by Dr. Horace Binney at the Boston City Hospital; at this time a gall-bladder full of stones was removed; the common duct was examined and found to be not abnormal; convalescence from this operation was uneventful; in August, 1920, patient had an attack of jaundice which lasted several days; since then he has had several attacks of a similar nature; with each attack there has been some pain. On Novemberr 19, 1920, the patient again entered the Boston City Hospital, stating that he had been jaundiced for two days, and complained of pain, mostly below the umbilicus; the jaundice at this time was deeper than at any previous time.

P. E.—Well developed and nourished; very markedly jaundiced; some tenderness in the right hypochondrium; the white count was 11600; patient was under observation for the next twelve days; the jaundice gradually increased; there was no elevation of temperature; on December 1, 1920, patient was operated on again by Dr. Binney. The abdomen was opened through the previous incision; many adhesions were encountered; the common duct was located with considerable difficulty; this was opened and a probe readily passed upwards toward the liver, but it could not be passed downward toward the duodenum; no evidence of stone was found; an anastamosis with a T tube was made between the patent portion of the common duct and duodenum; because of jaundice and slow coagulation time of the blood, the patient was transfused with 500 c.c. of whole blood from a grouped donor; during the first few days after operation the patient's condition remained about stationary; there was a free flow of bile through the tube and some oozing of blood from the incision; on December 4, 1920, the patient began to fail, and died on December 6, 1920. The autopsy showed acute nephritis and pneumonia; the lower end of the common duct was found to be absolutely obliterated for about 2.5 cm. by scar tissue; no opening with a probe could be found that allowed the probe to pass into the duodenum; there was no evidence of stone.

Persistent Sinuses.

A persistent sinus after cholecystectomy is a rather uncommon finding. When one such does occur, the cause should be determined and remedied, if possible. A foreign body, such as a drain or gauze, usually gives a sinus from which a sero-purulent discharge takes place, never quite ceasing. If such a cause is suspected, naturally an investigation should be made at once. A sinus which continues to drain bile over a period of weeks or months, especially if accompanied by occasional jaundice and perhaps pain, would lead one to think of the possibility of an undiscovered stone in the common duct. Again, a similar condition might well be caused by a carcinoma located in the Ampulla of Vater. These possibilities only make more emphatic the value and need of careful investigation of the common duct and Ampulla in every case of cholecystectomy. Of course, injury to the common duct, if sufficiently great, might lead to a persistent biliary fistula, but this injury should have been discovered at the time of operation, and measures taken to repair the damage done.

One case in this series which resulted in a persistent sinus was operated on by me after infection of the gall-bladder with stones. At this operation the gall-bladder, including stones, was removed. Unfortunately, no pathological examination was made of the gall-bladder. Later on, the patient developed a mass at the lower border of the liver. This occurred about eight months after the first operation. At the second operation, this mass was found to be cancerous and could not be removed. A sinus resulted, which did not heal, and from which there was a constant bloody discharge. The patient finally succumbed. I have not included this case as a death resulting from cholecystectomy because of the fact that the patient lived ten months after the gall-bladder was removed, and died from cancer of the liver rather than from the technical operation for removal of the gall-bladder.

It would perhaps seem that in this series of cases of cholecystectomy complications were too frequent. In several of the individuals two of these complications, unfortunately, occurred at the same time. In the final analysis, it appears that sixty-five may be said to have had a normal convalescence, and twenty-three to have had some one or more of the complications described above.

In conclusion, it may be said that in cholecystectomy the chief problems in the future narrow down to a determination of the best measures for the control of bleeding at the time of operation, the question of the value of and the harm done by drainage, and a further study in order to determine the causes of and precautions necessary to prevent pulmonary complications.

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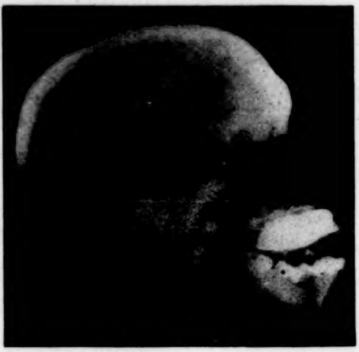
HEALTH OF CHICAGO SCHOOL CHILDREN.—The Department of Health of Chicago cares for the health of the 500,000 school children of that city. For carrying on this work, 114 school health officers and 86 school nurses are employed.

REPORT OF A CASE OF EXTENSIVE CAVERNOUS ANGIOMA OF THE HEAD, FACE AND NECK, WITH ATTACKS OF FEVER AND SOMNOLENCE.

By George Blumer, M.D., New Haven, Conn.

The occurrence of more or less extensive vascular tumors involving the head or neck, is by no means rare. Von Graff's analysis of the cases from the Vienna Surgical Clinic shows that, of 85 cavernomata, 69 occupied the head or neck. The case here reported is unusual not because of the extent or localization of the tumor, but because of the unusual character of the accompanying phenomena.



Mr. W. B., aged 49, a storekeeper and a native American, was first seen with his physician, Dr. Milo Rindge, of Guilford, in September, 1920, and was later studied on the Medical Service of the New Haven Hospital. His family history was negative. There was no epilepsy or mental disease in his ancestors and none were known to have vascular birthmarks. His past history was quite uneventful. He had diphtheria as a child and at 25 fractured his clavicle, but there was no history whatever of any cranial trauma. A naevus of the forehead, just external to the outer angle of the right eye, was noted at his birth. At the age of five an attempt was made to treat this with an "electric needle," but nothing had been done for it since that time. It had steadily increased in size. He had no symptoms in any way referable to the condition until about the age of 30, since which time three groups of symptoms have appeared, which are probably related to one another. For the past 15 to 18 years, the patient has had attacks of headache. These occur once or twice a month, are very intense, bilateral, occipital in distribution, and unaccompanied by nausea. Going without food tends to bring them on. In a typical attack the patient returns home late for lunch after a hard morning in the store. He is acutely hungry, somewhat pale, and his eyes are "dull." Food relieves him somewhat, but he has an intense occipital headache and feels slightly drowsy. He lies down and goes sound asleep, often to awake in a few hours feeling quite well.

During the past five to eight years, the patient has had attacks of drowsiness not associated with headache. He notices for a day or two preceding such an attack that he is "not up to the mark," he is slightly constipated, and unduly tired after his day's work. He has difficulty in concentrating his attention, is slightly garrulous, and at times feverish. He feels light headed and his gait becomes definitely unsteady. There is no true vertigo or tendency to fall in any particular direction. The patient feels "dopy" and drowsy, and the desire to sleep becomes "almost irresistible." In the milder attacks, sleep relieves him. With these attacks there are no ocular or auditory manifestations. There may be slight prickling in both hands or wrists or a pain in the elbow. There is no speech disturbance and memory is not affected. Three of the recent drowsy spells have been associated with a marked rise in temperature. The general and premonitory symptoms were as usual, but the patient had a shaking chill at onset and milder chilly sensations on succeeding days, with a fever as high as F. 103°. With two or three of these attacks he has had quite intractable hiccoughs.

During the past few months, the patient's fellow workers have noted three sudden attacks of complete unconsciousness, coming on suddenly and lasting 15 or 20 minutes.

Physical examination of the patient between attacks shows a well developed and well nourished individual. His color is good. The pulse is rather rapid, regular and of fair volume. The peripheral vessels are not thickened. The blood pressure is 104 systolic, 56 diastolic. The skin shows no eruption. There is no general glandular enlargement. On both sides of the neck anteriorly, more markedly on the right side, is a deep cavernous plexus of veins which collapses easily. These vessels are about 12 to 14 millimeters in diameter. In several of them, hard rounded bodies, non-sensitive and as much as one centimeter in diameter, can be felt. On the right side, the angiomatous mass becomes very superficial in the region just behind the outer angle of the eye, where it forms a bluish mass which, in its distended condition is five to six centimeters in diameter. In the region of this mass, the superior orbital ridge is defective and the outer tables of the skull appear to be absent. The angiomatous process involves not only both sides of the neck and the right temporal region, but also the ocular conjunctiva on the right side, the cheeks, the hard and soft palate, the right half of the tongue and the pharyngeal walls as far down as can be seen. There is no bruit over the skull in the region of the mass.

The eyes show no pronounced abnormality. There is slight coarse nystagmus on deviation to the left. The pupillary reactions are normal. There is no limitation of the visual fields. Dr. Eugene Blake, who has seen the patient several times, reports that the retinal veins are larger than the average, but the same in both eyes, and that the nerve heads are clear in outline and not swollen.

The general physical examination of the internal viscera is negative except for slight enlargement of the heart. The point of maximum impulse is not distinct to palpation. The relative cardiac dullness extends three centimeters to the right and 14 centimeters to the left of the median line. There is a slight systolic murmur at the apex, poorly transmitted. The second aortic sound is louder than the second pulmonic. The sounds are of good quality.

The neurological examination is almost negative. The deep reflexes are hyperactive, but bilaterally so. The abdominal reflexes are lively. There is no ankle or patellar clonus. The plantar reflex is normal. There are no motor or sensory changes, no atoxia.

Seen during an attack, the patient was quite pale. He was hiccoughing, especially after coughing. His mental processes were distinctly slower than normal. Speech was not abnormal. The breath was foul. The tongue was heavily coated. There were no neurological changes other than those present between attacks, and no changes in the viscera other than those already noted.

Lumbar puncture produced a clear fluid under increased pressure. Twenty cubic centimeters were withdrawn. There were fifteen cells to the cubic millimeter. The Pandy and Ross-Jones reactions were positive. The Wassermann and colloidal gold reactions were negative. The patient became pale and faint, mentally confused, and eventually much more somnolent after the lumbar puncture. His fever increased. There was no increase in his headache.

An x-ray of the skull, interpreted by Dr. C. R. Scott, showed general thickening of the tables with the vascular depressions somewhat more marked than normal. The sella turcica was clearly defined. There was absence of the left frontal sinus. There was destruction of bone in the right supraorbital region. There were numerous circular areas of increased density in the zone occupied by the angioma, some superficial, some deep, and varying in size from two to fifteen millimeters. These were regarded as phleboliths. X-rays of the gastrointestinal tract were negative. X-rays of the teeth showed infection of several roots.

The Wassermann reaction was negative.

The blood sugar, blood urea, and uric acid were all within the normal limits. The blood nitrogen was a trifle high, 49.8 milligrammes per cent.

The urinary and gastric analyses were negative.

Cultures of blood aspirated from the angioma during two of the febrile attacks were negative.

At Dr. Spalding's suggestion, the effect of adrenalin was tried; the patient receiving half a cubic centimeter intravenously while in a sitting position. This caused pallor, with throbbing of the head and some mental clouding which passed off in five or six minutes. The pulse became slow and weak; the respirations were not much changed. A repetition of the test with the patient recumbent caused great dilatation of the angioma with an uncomfortable feeling in the occipital region, as though something was "being pushed through from one side to the other."

The interest in this case lies in the interpretation of the paroxysmal attacks which, beginning about the age of 30, have increased in frequency and changed in character. What is the relationship between the headaches, the attacks of somnolence and the still later attacks of unconsciousness? A review of the available literature fails to reveal a case exactly comparable to this, and yet observations are to be found which permit us to make a probable diagnosis. There is no case on record in which such extensive localized thrombosis seems to have occurred, though occasional mention of phleboliths in angiomata is noted. One may, we think, legitimately suspect that the febrile paroxysms were dependent upon the formation of fresh thrombi in the angioma, even though blood cultures from the sinuses were negative during febrile periods. It seems quite clear, however, that even extensive local thrombosis could not account for the succession of paroxysmal symptoms which the patient has gradually developed, beginning with headache, and progressing through somnolence to attacks of complete unconsciousness. While not quite typical, the history of this case recalls in many ways, recorded cases of so-called cirsoid aneurysms or angiomata of the pia. As Isenschmidt has pointed out, some of these patients present a symptomatology which permits of diagnosis. The patients usually begin with attacks of headache, often with gastric symptoms; later, Jacksonian epilepsy appears, and finally, if there is no operative intervention, hemiplegia, with coma and death, closes the scene. This picture is frequently unassociated with definite signs of intracranial pressure and, as the lesion involves the pial rather than the dural vessels, there may be no noteworthy x-ray changes in the cranial bones. These patients not infrequently show cardiac hypertrophy. In our case the eye grounds were normal, the x-ray findings of the skull were minimal, but the lumbar puncture fluid showed definite abnormality. The failure of our patient to show Jacksonian attacks may be due to the fact that he has not yet reached that stage, but is more likely due to the localization of the process. It goes without saying that motor symptoms and signs are only to be expected when the motor areas are involved. In this case, there is just a suggestion that other areas, possibly the cerebellum, may be the site of a cirsoid aneurysm. The patient has definite staggering as a symptom premonitory to his drowsy attacks, and he has, at times, shown slight nystagmus. In spite of the lack of more definite signs, we must, I think, conclude that this is an instance of the association of an external angioma of the cranium and face, with an independent internal angioma involving the pia mater. While in some recorded instances communication between the external and internal process has been observed, such cases are very exceptional, and there is no evidence of it in this case.

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PARESIS TREATMENT BY ARSPHENAMINE AND MERCURY.

BY CLARENCE A. BONNER, M.D., WORCESTER, MASS.

THE following series of cases were treated at the Warren State Hospital, Pa., between July, 1918, and July, 1920, with a view to determining possible benefit in the administration of combined treatment. In order that a comparison be made, the records of untreated admissions during this period, suffering from paresis, were reviewed, and some interesting facts brought forth, especially regarding the brief tenure of life in this disease. All the cases studied were diagnosed at staff-meeting and further confirmed by positive laboratory findings. The patients were not selected, but varied in both physical and mental state. The number of cases treated is small, but results obtained are in agreement with the findings by workers with a larger group.

There has been considerable interest shown in this subject by a number of State Hospitals during the last five years, and the value of intravenous injections of arsphenamine in neurosyphilis has been well brought to test. In this work, mercury inunctions were employed, and also a brief course of potassium iodide. The object of this paper is to record the findings as observed in a two year period at this institution.

What benefit has been accomplished will have to be measured by such facts as the duration of life after admission, capabilities exhibited after the initial disturbance, and continued improvement and conduct sufficient in some cases to warrant a parole from the hospital. This data, of course, is readily obtainable from the case histories, and daily observation of the patient. It has been interesting from a psychiatrical viewpoint to note a peculiar form of insight exhibited by many of the paretics under treatment, manifested in their anxiety and cooperation to receive treatment. This, of course, refers to the less deteriorated cases.

Weekly treatments were given twenty-eight males diagnosed general paresis, beginning with 0.3 gm. arsphenamine, which was pushed as rapidly as conditions would permit, to the maximum 0.6 gm. There were but few unfavorable reactions in well over three hundred injections. It was intended to use blue ointment to a point of saturation during the entire period, but shortage of help prevented this valuable adjunct being used as consistently as was desired. Each case also received, for one month, potassium iodide in a dosage of thirty grains per day.

It was found that the Wassermann reaction was influenced but little in the purely paretic types, even with the most intensive treatment. One case, bordering on the paretic zone, as interpreted from the gold sol reading, was reduced; one clearly in the paretic zone was reduced, and one spinal fluid was changed so that the gold sol reaction was absent. Among the cases allowed to go home, but one improved, as far as the serology was concerned, which is an interesting inference.

The average time that the disease had existed, both in the treated and untreated cases, previous to admission, reckoned in months, was fifteen. The average duration of life in the treated cases that died in the hospital was five months, and four months for the untreated cases. The remissions in the treated cases were longer sustained than in the untreated, and the former made much better ward cases.

Of the treated cases, eight have been discharged, or twenty per cent., and but two of the untreated cases have been removed from the hospital, or four per cent. At the expiration of the two-year period, twenty-seven out of forty-two untreated had died, and of the treated, six died before a minimum series of ten treatments had been given, and two died shortly after the series was completed. Twelve of those treated are still residents of the institution, and but two of this number are bedridden.

Continued observation of the treated cases is necessary as a criterion of the advisability of routine intensive treatment. Surely, if some benefit is obtained, the matter should not be lost sight of, and a measure of relief offered in this deplorable condition. It must be remembered that the majority of the cases that State Hospitals have to deal with are far advanced. In the interests of humanity, if the general practitioner would consider every syphilitic as a potential paretic, paint the future as it may possibly be, apply intensive treatment, and advise a routine Wassermann and lumbar puncture at least once a year, keeping careful records, the number of paretics during the ensuing years would be greatly diminished and thus many wrecks prevented.

SUMMARY.

1. Course of duration of bedridden stage seems lessened by treatment, and dying patients in this stage do not linger so long in the usual wretched state.
2. Serology bears no relation to remissions.
3. Duration of ward life seems lengthened.
4. The results are found to be favorable to treatment, but do not warrant a change in prognosis.
5. Certain cases respond and others do not. No explanation is offered, unless it may be that the meningeal types, as have been reported, offer a better therapeutic opportunity.

A FEW REMARKS ON THE X-RAY IN THE DIAGNOSIS OF CHRONIC APPENDICITIS AND CHRONIC CHOLECYSTITIS.

By Frank H. Lahey, M.D., Boston.

Roentgenology has been of such importance as an aid to diagnosis that one hesitates to say anything on the subject that may seem to be in the nature of adverse criticism, lest it be construed as in some measure destructive.

The following remarks, however, are in no way intended to reflect upon the importance of roentgenology. Expertly applied, wisely interpreted, and properly correlated, no one can question its inestimable value.

X-ray pictures are graphic reproductions of a part, or parts, as they exist at the instant the exposure is made, and their value should be considered always in connection with the fact that the interpretation of these photographs is open to the same human liability to error that exists in all methods of physical diagnosis. In this especial connection I am impressed by the readiness with which x-ray evidence is sometimes accepted as a diagnosis, rather than as evidence to be correlated with history, physical findings, and other laboratory evidence.

I feel that this is particularly true in regard to x-ray evidence as related to the diagnosis of chronic appendicitis and adhesions about the caecum or terminal ileum; also as regards cholecystitis and adhesions between the gall-bladder and the pylorus.

It is my feeling that x-ray reports containing the positive x-ray diagnosis of chronic appendicitis are quite wrong, and sometimes lead to erroneous conclusions, resulting in operative procedures that in many instances fail to give the patient the relief he is led to anticipate.

After several years of operative experience, in both a charity and a private clinic of considerable size, I have concluded that far from being capable of arriving at a diagnosis of chronic appendicitis by x-ray, I am often at a loss to know how to arrive at such a diagnosis after employing all available diagnostic measures.

I frequently receive from the roentgenologist a report with either the diagnosis of chronic appendicitis, or the far more logical statement of x-ray findings consistent with a chronic appendicitis as indicated by filling defects, fixation, or suggested adhesions about the appendix or terminal ileum; and yet operative end results and gross pathological findings have been extremely disappointing in many of the instances in which I have had the opportunity to examine the appendix in the course of other operations. How many times while doing routine appendectomy in other abdominal procedures, an appendix is found bound firmly by adhesions in such a way that an x-ray picture could not fail to reveal its fixation or defective filling, yet in a carefully elicited history there appears not the slightest indication of previous attacks or present ill effects.

It has been my experience also, on a limited number of occasions, to have been swayed to surgical measures in doubtful cases of cholecystitis by presumptive x-ray evidence of this condition based upon fixation of the pylorus to the right, upon filling defects of the duodenum, suggesting the cause to be that of adhesions between the gall-bladder and the duodenum, or else upon the presumption that a gall-bladder whose outline may be demonstrated, is pathological. Operative procedures undertaken largely upon such x-ray evidence will, I believe from my experience, yield distressingly unsatisfactory results.

Inasmuch as it is known that conditions may exist about an appendix or gall-bladder which will make it appear different by x-ray from what is now considered the normal appearance by x-ray, and yet with the patient free from symptoms, it is my feeling that the roentgenologist should not report the result of his x-ray findings in terms of diagnoses, such as chronic appendicitis or chronic cholecystitis, lest a report of that kind be given undue weight by those who have not had an opportunity to estimate such evidence, or lest it sway toward operation those inclined too readily to attribute to chronic appendicitis much of the indefinite discomfort which often occurs in the right iliac fossa.

My excuse for these few critical or warning remarks is that, manifestly here, as with many laboratory measures, care must be taken lest because of the graphic character of reproduction by x-ray we overvalue this evidence as compared with the less tangible though often more essential evidence that accompanies appreciated pain and discomfort.

I can hardly over-emphasize the importance of a personal review of the plates by the surgeon with the roentgenologist, in order that one may weigh for himself the value of the evidence offered by this diagnostic measure. As a surgeon, I feel very strongly opposed to the complete divorcing of this diagnostic measure from the very person who has the greatest opportunity of weighing its value by actual comparison of findings with results.

Finally, I believe we should hesitate to advise operation on the basis of x-ray findings without fairly typical symptoms, except as an exploratory procedure,—a measure of which no one need be ashamed to make use when findings are suggestive of malignancy, or are urgent though unexplainable even after the use of all diagnostic measures.

NEUROTOMY (STOFFEL OPERATION) IN A CASE OF SPASTIC PARAPLEGIA FOLLOWING SPINAL FRACTURE.

BY R. N. HATT, M.D., BOSTON,
Assistant Orthopedic Surgeon to Out-Patients, Massachusetts General Hospital.

CASE REPORT.

W. D. Z., male, aged 29, single; occupation, sailor; admitted to the Orthopedic Service of the Massachusetts General Hospital, September 8, 1920, from the Out-Patient Department. Chief Complaint—Stiffness of the right leg, difficulty in walking. Family History and Past History—Unimportant. Present Illness—Ten years ago patient fell from the deck into the cargo hold (a distance of about 30 feet). His back and right collar bone were broken. He thinks he did not lose consciousness, but he was unable to stand, and there was no feeling below the hips. He was immediately taken to a hospital in Rotterdam, where he lay for eleven weeks with weights attached to head and feet. Sensation began to return during the first week. Three weeks later he could move toes of left foot, and after six weeks the toes of the right foot. A plaster jacket was applied for six weeks. During this time he was encouraged to move about by means of ambulatory benches or horses. The left leg improved rapidly and he gained practically complete control on that side. The right, however, showed very little improvement beyond ability to move the toes. A second jacket was applied, which he wore continuously for a year (!). During this year he received electrical treatment and massage, with gradual improvement. The following year he was referred to a clinic in Amsterdam for treatment with the Zander apparatus. Zander work tended to increase the stiffness of the right leg and was discontinued after six months. He then returned to Rotterdam and was advised to give up treatment, inasmuch as further improvement depended upon his own efforts. An opportunity for light work aboard ship as an assistant steward was accepted and he held that position until about three weeks before coming to Boston. The duties performed were chiefly those of a second cook, but falls were frequent, and even the moderate activity demanded by the work was very fatiguing.

Physical Examination—Well developed and nourished young man, mentally clear and co-operative. *Gait* peculiarly spastic; the right lower extremity is flexed at the hip, markedly adducted, and the foot is in equino-varus; clonus is induced at each step and the left leg has to be swung around the adducted right leg. Examination of the head, neck, thorax and abdomen, upper extremities and external genitals, negative. Spine—There is a rounded kyphos in the region of the eleventh and twelfth thoracic vertebrae, and a sharp lordotic curve in the region of the third lumbar vertebra. Motion in all parts restricted, but present to a fair degree. Lower Extremities—The right shows permanent flexion and adduction deformity of the thigh, partially correctible under *gentle* manipulation. All of the muscle groups are spastic. The right foot is in the position of equino-varus. The left lower extremity is slightly spastic, but full range of voluntary motion is present. Reflexes—Knee jerks on the right are characteristically spastic. There is right clonus and Babinski. No sensory disturbances are noted. Blood—Wassermann, negative. X-ray—The sacrum appears flattened. There is an irregularity in the third lumbar vertebra, and the body of the twelfth thoracic is increased in its transverse diameter. Old fracture of the twelfth thoracic and third lumbar vertebrae.

Neurological Opinion—Originally, a haematomyelia with cord injury at the twelfth dorsal and first lumbar segments, probably. Prognosis—Permanent condition as exists at present. No treatment advised unless some peripheral means are indicated.

Operative indications were correction of adduction and equino-varus deformities by restoring power balance in the affected muscle groups.

Operation—September 22, 1920. Under ether anesthesia, the anterior ramus of the obturator nerve was resected 3 cm. from the obdurator foramen. The tibial nerve was exposed at the popliteal space and two-thirds cross-section was resected from the funiculi to the gastrocnemius; the dorsal funiculus to the soleus was completely resected. The funiculis to the tibialis posterior was resected to one-half cross-section. Surgical recovery uneventful. On the second day following operation, the general spasticity seemed markedly aggravated. This soon subsided, however, and at the end of a week, a fair range of voluntary abduction of the thigh, dorsiflexion and abduction of the foot were possible. The patient was discharged from the hospital on the eighth day following operation, and nine days later secured a position in the hospital as ward tender. The improvement in his gait was quite remarkable.

On November 20, 1920, he reported with a painful, swollen knee on the right, which was apparently due to strain, incident to his new static position and consequent activity. An accident, occurring in the course of his work some days after, necessitated readmission to the ward. His spasticity in general had been aggravated by the injury. This quieted down with rest, but, following consultation with Dr. Osgood and Dr. Smith-Petersen, it was decided that further improvement could be obtained and possible relief of the knee strain could be effected by correcting his hip flexion. Neurotomy of nerves to the ilio-psoas being out of the question, its detachment from the lesser trochanter was carried out in the following manner:

Operation—December 8, 1920. Through an incision over the gluteus maximus, fibres of that muscle were divided in their longitudinal plane, likewise those of the quadratus femoris, and the ilio-psoas was raised from its insertion subperiosteally. As the muscle was detached, the thigh hyperextended without force. Surgical recovery uneventful. The patient was discharged to the Out-Patient Department twelve days later, where he has been under observation up to the present time.

His knee symptoms have been entirely relieved, extension of the thigh is free, there is considerably less lumbar lordosis, and corrections resulting from the nerve operation have not only been retained, but have shown improvement both in the degree of motion and in the volitional control. He is at present able to walk a mile or more without fatigue, and is employed as a fireman at one of the hospital buildings. He intends to return aboard ship as a seaman within the next month.

CONCLUSION.

It goes without saying that an end result is not embodied in this report. The immediate effect of the operations is favorable. Regeneration of the resected nerves, with return of spasticity, has been forestalled by transplanting the proximal stumps into the superficial fascia. Other contingencies may arise later on to discredit present results. It does, however, seem fair to infer that cases of this type offer a field for neurotomy.

Further studies, including technique of operation, will be offered in a future communication.

MARKED SCLEROSIS OF THE ABDOMINAL AORTA.

By Clifton R. Scott, M.D., New Haven, Conn.,

Instructor in Radiology, Yale Medical School.

Arteriosclerosis is so common, and various calcium depositions in the body are so numerous, that when coupled with the radiographic examination of today we frequently diagnose many conditions which hitherfore were considered rare or only seen upon the autopsy table.

Arteriosclerosis, calcified glands, calcified hemangiomata, myositis ossificans, gall bladder and urinary calculi are seen almost daily in a large radiological clinic. However, the case presented, a well advanced case of arteriosclerosis, is unusual in the degree and location of the calcium deposition.

The patient was a married woman of 64 years, who was advised by her physician to enter the hospital for diagnosis. The following is a brief history and findings of the case:

About 24 years ago the patient had an acute swelling of the glands in the right axilla. The swelling later ruptured, discharged some pus and finally healed. The glands of left side of the neck were lanced 14 years previous. At present there is a mass in the abdomen. This mass, coupled with the enlarged axillary glands, caused the physician to suspect the possibility of carcinomatosis.

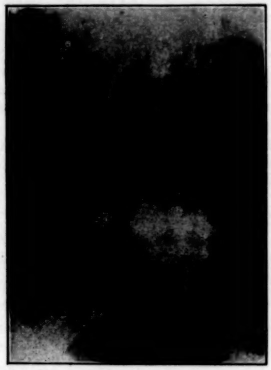

FIG. I.

Physical examination showed the cervical glands to be barely palpable. In the right axilla were found several cherry like, hard nodules, freely movable but attached to the skin beneath an old scar. The left axilla was negative.

In general the chest showed the percussion note to be hyper-resonant throughout. There was relative dullness at both apices where the spoken and whispered voice was increased and the breath sounds slightly prolonged. The percussion of the heart was masked to some extent by the emphysema of the lung. The cardiac impulse was in the fifth interspace, 8 cm. from the mid line. There was a fine thrill, either with systole or just preceeding it, at the apex. The first sound was not transmitted to the axilla but could be heard along the sternal margin. The second pulmonic was accentuated. There was a short systolic murmur at the base which was faintly transmitted to the vessels of the neck. There was no thrill present and the second aortic, although not loud, was somewhat snapping. Except for slight thickening of radial artery, the pulse was negative.

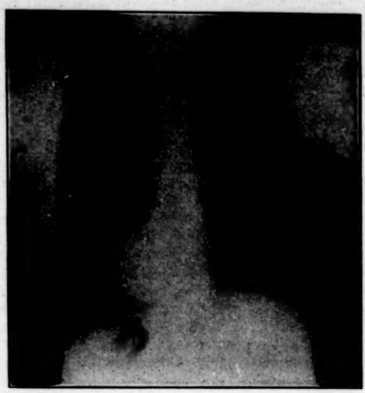

FIG. II.

The abdomen was thin and relaxed. There was a marked diastasis of recti. The liver reached 1 cm. below costal margin and was not

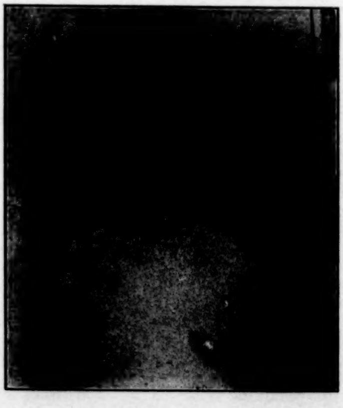

FIG. III.

tender. The right kidney was palpable. Just to the left of linea alba, extending vertically downward, and parallel to it, was an elongated, firm mass which extended downward to a point 1 cm. below umbilicus. The abdominal aorta pulsated above and below the mass, and over the upper end a systolic bruit could be heard. The mass was smooth and was very slightly movable; upon deep pressure there was some pain in the back. In the left lower quadrant was an oblique mass, the size of the finger, corresponding to the position of the common iliac artery.

Figure I represents a radiographic picture of the lumbar region and shows a well marked calcification of the lower portion of the abdominal aorta to its bifurcation just to the left of the fifth lumbar vertebra. The lateral view (not shown) shows well calcified borders and no destruction or atrophy of any of the vertebra.

Figure II shows a well marked calcified crescent shaped plaque in the arch of the aorta. Numerous calcifications in the hilus region and in the upper cervical and axillary glands.

Figure III shows entire calcification of femoral arteries on both sides. The plate has been retouched somewhat and is not exceptionally clear.

The blood pressure, Wassermann and other tests were negative. The diagnosis was arteriosclerosis, emphysema and probably old pulmonary tuberculosis, with calcified cervical and axillary glands.

THE USE OF SODIUM BROMID SOLUTION IN PYELOGRAPHY, AND ITS TOXICITY IN COMPARISON WITH OTHER MEDIA.[*]

By Edward L. Merritt, M.D., Fall River, Mass.

Pyelography is the process of obtaining a radiograph of the pelvis of the kidney and ureter, by first injecting the pelvis of the kidney and ureter with an opaque substance, and then taking an x-ray plate of the same.

This work was first successfully demonstrated by Professor Voelcker of Heidelburg, in 1906, but since that time the technique has been more or less improved upon until today it is being well demonstrated by urologists over the entire world.

There is no longer any question as to the great value of pyelography. Whenever renal catheterization is necessary for purposes of diagnosis, the procedure is almost routine. Ever since Voelcker's demonstration, urologists have sought an opaque medium other than the colloidal silver preparations commonly used. These mediums have been definitely shown to be injurious to the kidney tissue, and it is also known that they enter the circulation.

Two years ago, Weld[1] carried out the following series of interesting experiments regarding the toxicity of mediums used in pyelography. Dogs were anaesthetized and kept under light constant ether tension by the Connell apparatus. The carotid artery was arranged to record carotid blood pressure. The femoral vein was exposed for injections. Solutions of 25% sodium bromid, 25% potassium iodid, 25% sodium iodid, and 15% thorium nitrate, were tested. The intravenous injection of the sodium bromid, in four different dogs, produced practically no effect, even when 55 c.c. were given. Usually, there was a slight increase in blood pressure, possibly due to an increase in fluid volume. Injecting 2 to 3 c.c. of the potassium iodid solution caused the blood pressure to drop almost to zero, and almost instant death. Injecting 50 c.c. of the sodium iodid solution in two dogs, caused a slight reaction, from which the animals soon recovered. The toxicity of the thorium nitrate was variable, and seemed to be influenced by the age of the solutions. However, several of the animals died immediately following its use, and in several others the reaction was severe.

Weld, in this same paper, reports a death following the use of thorium. Burns,[2] in 1916, published an article recommending the use of this medium, and apparently had good results with it. Notwithstanding this fact, it is believed that thorium has a direct toxic effect on the heart muscle. Incidentally, it is more difficult to prepare than some of the other mediums. To prepare it, one must neutralize with sodium hydroxide in the presence of sufficient sodium citrate to prevent precipitation of the thorium. This is a complex process and must be performed with care. Again, thorium salts are expensive and often unobtainable at drug firms.

Thorium iodid has been used with some success, but it is very scarce and expensive. The objection to strontium iodid and bismuth is that both these substances form a precipitate, even after the most careful preparation.

In March, 1918, Cameron[3] made a preliminary report on the use of potassium and sodium

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[*] Received January 7, 1921, for publication.

iodid as mediums, and reported very favorably on them. Potassium iodid, however, should be used very carefully as a medium, because of its toxicity, and also because it is readily absorbed from the pelvis of the kidney.

In a later paper,[4] Cameron reports the use of sodium iodid in a 25% solution, and recommends its use. He states that, up to the time of that report, he had used it in eight cases, with no toxic effect. There is, however, apt to be considerable irritation and pain following the use of either the potassium or sodium iodid.

There have been some reports made of the use of emulsions of iodoform. The opacity of this substance is undoubtedly due to the iodin. It is noted by Cameron in his paper, that the opacity of the silver iodide preparations commonly used, is probably due to the iodin rather than the silver content.

Of all the mediums known, collargol is undoubtedly the most commonly used. However, it is known to be injurious to the kidney tissue, and several deaths following its use have being reported. Argyrol, cargentos and argentide have the same action on the kidney tissue as collargol.

In 1919, following Weld's experiments, working in conjunction with B. C. Willis of Rocky Mount, N. C., I used sodium bromid in a 20% solution on three cases. It was known to us that many urologists over the entire country were at that time using this preparation with good results. Dr. Willis had previously used this same medium on several cases, and it was at his suggestion that we used this substance instead of some of the more common ones I had used previously. Our results were most satisfactory. The pictures were distinct and clearly outlined. None of the patients suffered any local irritation or pain, and in no case was there the slightest evidence of any reaction. Following that series, I have used sodium bromid in the same strength on four other patients. In every one of these the results were equally satisfactory.

SUMMARY.

1. It is believed that, of all the mediums in use at the present time in pyelography, sodium bromid is the least toxic.
2. Sodium iodid is the next best medium.
3. Potassium iodid and thorium nitrate have a high toxicity, and the use of these mediums is not to be encouraged.
4. Sodium bromid is non-toxic, cheap, easily prepared, readily accessible, non-irritating, and, at the present time, would seem to be the best medium as yet brought forward. For pyelography, a 20% solution is recommended. The drug should be chemically pure and sterilized by boiling, prior to use.

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THE NORMAL WEIGHT.

SPERK, at a meeting of the Society of Physicians in Vienna, wisely points out (*Wein. klin. Woch.*, May 5, 1921) that the average weight of human beings is not necessarily the normal weight of each individual, and that any determination of body weight without simultaneous measurement of certain morphologic elements is inadequate for the judgment of the individual conditon. [R. M. G.]

ORGANIC VAGUS DISEASE AS CAUSE OF GASTRIC ULCER.

HOLLER (*Wein. klin. Woch.*, May 12, 1921) advances the theory that the cause of chronic ulcer of stomach and duodenum in man is an organic disease of the organs, produced by parenteral absorption of protein bodies, and outlines the principles of a new therapy of peptic ulcer based on the experience of a series of fifty cases treated in Ortner's second university medical clinic at Vienna by vaccine-urine injections intended to counteract this process. He seems to disregard the important etiologic relation to gastric ulcer of the chronic passive congestion and circulatory stasis associated with gastroptosis. [R. M. G.]

IODIN IN THE CEREBRO-SPINAL FLUID, WITH SPECIAL REFERENCE TO IODID THERAPY.

OSBORNE, E. D. (*Jour. A. M. A.*, May 21, 1921) finds that iodin is present in the cerebro-spinal fluid of normal individuals, and is present in increased amounts following the administration of iodid by mouth, by rectum and intravenously. The iodin content, however, is smaller when administration is by mouth or by rectum than when it is given intravenously. By the latter method, a definite curve can be plotted according to the amount given. Observation from this work suggest that the neurosyphilitic tissue takes up more iodin than normal nervous tissue and also that the presence of a meningitis menaces the permeability of the meninges to iodin compounds in the blood [E. H. R.]

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PUBLIC HEALTH ACTIVITY AND PRIVATE PRACTICE IN VENEREAL DISEASE CONTROL.

In a brief but pointed article, bearing the above title, Dr. John H. Stokes of The Mayo Clinic[*] calls attention to the efforts made by the U. S. P. H. S. and the associated venereal disease division of various state boards of health to work in harmony with the medical profession along this line. It may be said that thus far the policy pursued has been successful; for, although medical men in general have been deeply concerned over the so-called "socialization of medicine" as exemplified by attempts to put through maternity aid, they have accepted, with very little criticism, the various steps taken in the war on venereal disease. This may be due partly to the genuine desire of every doctor worthy of the name to aid in the clearing up of venereal disease, even though success in this direction decreases his own practice. It is due even more largely to the spirit of coöperation evinced by those having the campaign in hand.

The United States Public Health Service and the associted venereal disease divisions of various State Boards of Health are evidently fully awake to the necessity of coöperation, and in order to make clear their position as regards the duties and privileges of the private practitioner they have submitted the following declaration of principles and intentions:

> They endorse and urge the continuance of a campaign of public education.
>
> They urge the evaluation of the propaganda thus far carred on in as exact social, psychologic, and medical terms as possible.
>
> They prefer education and persuasion to legal process in regard to law enforcement and regulation.
>
> They ask the intelligent and sympathetic cooperation of the medical profession. This cooperation can best be obtained by the rapid extension of specialized teaching facilities for medical students; by making available to physicians the latest developments concerning the venereal diseases; and by the use of practicing physicians.

Having accepted its share of responsibility for developing an appropate equipment, the Public Health Service and its affiliated state organizations urge physicians at large to move for a general raising of the standard of treatment of the venereal diseases. In the words of the resolution:

> This implies that a physician who is unfamiliar with or unprepared to employ modern methods in the management of these diseases should not accept such cases for treatment, but should refer them to some private or public physician who is properly equipped.

With these principles, no fault can be found. They take into account the rights of the individual physician and offer him every opportunity to function, but, quite justly, they get the public health above the purely selfish demands of those physicians—let us hope they are few—who would prefer to hold their patients, contrary to the best interests of the latter.

MOSQUITO DESTRUCTION AND PREVENTION.

The Boston Health Department has under way its summer service looking toward the destruction and the prevention of mosquitoes. The dry weather of the current spring has contributed very materially up to the present time to keep the mosquitoes in abeyance, and many places that are ordinarily recognized as sources of the mosquito nuisance have as yet given no offense.

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[*] Jour. A. M. A., Vol. lxxvi, No. 18, April 30, 1921.

The Department began last year the collecting and recording of data showing the location of the various ponds, permanent and temporary, where mosquitoes breed; the times when the mosquitoes or their larvae have been found in such ponds; the dates of spraying with oil; and the name and address of the person responsible for the nuisance. Spraying is effected by a crew specially maintained for the purpose, equipped with a motor truck on which is located a motor-driven syphon, and provided with a knapsack spray outfit. An effort is made to procure the draining or filling of offending accumulations of water, but this is sometimes impossible and is often difficult; hence the necessity for systematic spraying.

While the anopheles is not among the commoner mosquitoes in this vicinity, yet Dr. A. P. Chronquest, Senior Surgeon (R) P. H. S., Medical Officer in Charge of the West Roxbury Hospital, recently reported to the Health Department the finding of anopheles in two of the swamps on the hospital property.

MEDICAL NOTES.

Dr. Thomas W. Salmon has been appointed Professor of Psychiatry at the College of Physicians and Surgeons, Columbia University, New York City, and has resigned from the staff of the Rockefeller Foundation; both appointment and resignation taking effect July 1st.

Dr. Salmon will continue to serve as the medical Director of the National Committee for Mental Hygiene.

Dr. Homer Gage has been elected to the position of Overseer of Harvard College. By this electioon, the medical profession is honored and the University is to be congratulated.

In response to a request of the Somerville Medical Society, a meeting was held in the Medical Library, June 29, to consider the advisability of forming a mutual company to provide indemnity insurance for members of the Massachusetts Medical Society. All present were favorable to such a plan, although Mr. George H. Crosbie, representing the Northwestern Mutual Life Insurance Co., after securing permission to speak, advocated having the Massachusetts Medical Society insure its members, or getting the Society members as a group to take out insurance in his company. Everyone understands that the Society cannot enter upon the insurance business, but Mr. Crosbie argued that if the arrangement could be made, his company would give insurance at about twenty dollars per year, whereas it is probable that a mutual company composed of members of the Society would have to charge nearly as much.

It was the consensus of the meeting that a canvass of the State should be made to ascertain how many would like to join a mutual company. The result will be published later.

Week's Death Rate in Boston.—During the week ending July 2, 1921, the number of deaths reported was 150, against 184 last year, with a rate of 10.40 against 11.87 last year. There were 16 deaths under one year of age against 29 last year.

The number of cases of principal reportable diseases were: Diphtheria, 63; scarlet fever, 18; measles, 94; whooping cough, 14; typhoid fever, 3; tuberculosis, 50.

Included in the above, were the following cases of non-residents: Diphtheria, 2; tuberculosis, 4.

Total deaths from these diseases were: Diphtheria, 2; scarlet fever, 1; measles, 2; tuberculosis, 15.

Included in the above were the following cases of non-residents: Diphtheria, 1; tuberculosis, 1.

Makes Anaesthesiology Required Work for All Graduate M.D.'s—Governor Stephens of California has signed a bill known as Senate Bill 401, adding "Anaesthesiology Hours 32" to "minimum requirements for a Physician and Surgeon certificate." This step makes California the first state in the Union to list anaesthesia as a required subject in the medical curriculum. Dr. Seymour in commenting on this measure, expresses the hope that shortly this important subject will be transferred from the elective to the required list in every state in the Union.

HEALTH PROTECTION FOR YOUNG WORKERS.—The United States Department of Labor, through the Children's Bureau, has just issued a report called "Physical Standards for Working Children," in which a committee of eleven physicians appointed by the Children's Bureau, explain how the health of children at work may be protected. Dr. E. H. Edsall and Dr. Harry Linenthal, of Boston, are members of this committee.

An effective means of protection lies in the adoption of physical standards which all children entering industry are required by law to meet. Eighteen states now have a law requiring children to be examined before going to work. These states are: Alabama, Arizona, California, Connecticut, Delaware, Illinois, Iowa, Kentucky, Maryland, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, and West Virginia.

The most comprehensive of these laws requires that a child shall be of normal development for his age, in sound health and physically fit for the occupation which he is about to enter. But unless examining physicians have definite standards by which to test development and sound health, underdeveloped and physically defective children are likely to go to work early, to their own serious disadvantage, in spite of excellent laws intended for their protection. The Committee, therefore, has undertaken to define what constitutes normal development and sound health for children applying for working papers.

The report of the Committee contains minimum standards of height and weight for specified ages, based on the most trustworthy experience and present day practice. It also lists defects for which children should be refused certificates, remediable defects for which they should be refused certificates pending correction, and conditions requiring supervision under which provisional certificates for periods of three months may be issued. The points which examining physicians should cover if adequate protection is to be given the working child are given in detail in the report, which also contains a record blank for the use of physicians in making these examinations.

Periodical examinations for children after they have gone to work are recommended by the Committee as a still further means of protection. As yet no state has taken this step, though an exceptionally good opportunity for putting into effect an adequate program of health supervision, says the report, is furnished by the compulsory continuation-school laws now in force in 22 states.

A NON-TECHNICAL COURSE IN "ANATOMY AND PHYSIOLOGY OF DISEASE."—In the *Jour. of the A. M. A.* for June 25, 1921, Professor Manwaring of Leland Stanford Junior University School of Medicine, describes a course aimed to give the college undergraduate an elementary idea of the nature of disease.

This course, together with a course on Hygiene of Infectious Diseases, are admittedly directed against the development of medical fads and cults. The course in Anatomy and Physiology of Disease consists of twelve lecture-demonstrations. It is easy to believe that such a course would be both interesting and valuable to the average layman. The outline of the twelve lectures gives a good idea of the ground which is covered.

1. Introduction.—Nature and object of the course; hygienic importance of adequate popular knowledge of the nature of disease; disease defined.

2. Illustrative Types of Disease.—(*a*) *Diseases of the External Surface of the Body.*—(i) Congenital defects, developmental anomalies. (ii) Diseases due to loss, death or destruction of tissues. (iii) Diseases due to shrinkage, atrophy or senile changes in tissues. (iv) Diseases due to overgrowth and hypertrophy of tissues. (v) Diseases due to increased fluid or exudate in tissues. (vi) Diseases due to abnormal functional activity of tissues.

3. (*b*) *Diseases of the Circulatory System.*—Subdivisions as in *a*.

4. (*c*) *Diseases of the Respiratory System.*—Subdivisions as in *a*.

5. (*d*) *Diseases of the Digestive System.*—Subdivisions as in *a*.

6. (*e*) *Diseases of the Nervous System.*—Subdivisions as in *a*.

7. The Diagnosis of Disease.—(i) Illustrative methods. (ii) Difficulties. (iii) Success and failure in diagnosis as shown by necropsy records. (iv) Accuracy of lay diagnosis.

8. Curative Forces and Mechanism of the Body.—(i) Forces and mechanisms tending to remove, neutralize or otherwise render the injurious agent inoperative. (ii) Forces and mechanisms tending to repair, replace or compensate for tissue injury. (iii) End-results of curative and reparative processes, percentage of spontaneous cures (statistical), etc.

9. Scientific Treatment of Disease.—(i) Illustrative physiologic actions of therapeutic agents. (ii) Illustrative applications to treatment of disease. (iii) Results of rational treatment (statistical).

10. Popular Remedies, "Patent Medicines," Etc.—(i) Illustrative types of popular remedies, dangers from self-treatment, etc. (ii) Illustrative examples of "patent medicines," methods of commercial exploitation, results of treatment, dangers, laws governing, etc.

11. Irregular Practitioners.—(i) Advertising specialists. (ii) Osteopaths, chiropractors, etc. (iii) Religiotherapy. (iv) Laws governing.

12. Medical Education, Medical Research.—(i) Methods, aims, curriculum, etc. (ii) Laws governing. (iii) Unsolved problems in research.

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Obituary.

JOSEPH HENRY POTTS, M. D.

Dr. Joseph Henry Potts died at his home in Holyoke, June 16, 1921, after a long illness. Dr. Potts was born at Barnett, Vermont, January 19, 1859. He was graduated from the Dartmouth Medical School in 1884, studied a year in London, England, and subsequently at the Boston City Hospital. He settled in Holyoke in 1898, and joined the Massachusetts Medical Society in that year, having previously lived and practised in Lynn, Mass. His attention was directed chiefly to ophthalmology. In Holyoke he served four years as a member of the School Board. Dr. Potts was a thirty-second degree Mason. He is survived by a widow and one son.

Correspondence.

DEVELOPMENT OF THE THYROID.

Mr. Editor:—

Boston, June 30, 1921.

In a recent issue of the Boston Medical and Surgical Journal, on page 694 of Volume CLXXXIV, in the article by Joseph Stanton, M.D., on goitre, there occurs a paragraph, under the heading "Embryology," in which the derivation of the thyroid is given absolutely incorrectly and in a manner which, to anyone conversant with recent or older text books on the subject, places the Journal in a position of ridicule. As this Journal represents the Massachusetts Medical Society and is the oldest medical weekly journal in America, I feel sure that it is only through some gross error that such statements have been allowed to appear in it, and I trust that for its own sake the Journal will see its way clear to disavow them publicly.

Yours very truly,

J. L. Bremer.

[The Journal regrets extremely the appearance in its columns the mis-statement referred to by Dr. Bremer. At the request of the Editor, Dr. Bremer has sent us the following explanation of the development of the thyroid.—*Editor.*]

"In 'A Text Book of Histology, Lewis and Stöhr, second edition, 1913,' on page 217, the following description of the development of the thyroid gland occurs:

> "'The pharynx opens to the exterior at the mouth, and divides posteriorly into the trachea and oesophagus. In the median dorsal line it gives rise to the anterior lobe of the hypophysis, and in the median ventral line to the thyroid gland. This gland is a median structure, entirely separate from the pharyngeal pouches. It grows down through the hind part of the tongue, acquiring a position in front of the trachea. Its branching terminal part becomes separated from its outlet by the obliteration of its duct (called the thyroglossal duct). A blind pit, the foramen caecum, permanently retained at the back of the tongue, marks the former outlet of the duct. Thus the thyroid gland is a detached clump of entodermal tubules in front of the trachea.'

"I may add that the term 'pharynx' is here used as of a time after the oral plate, the demarkation between entodermal pharynx and ectodermal mouth, has disappeared. The anterior lobe of the hypophysis, or pituitary body, is of ectodermal origin."